OBSERVATIONS ON *FRYXELLIA PYGMAEA* (MALVACEAE)

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ABSTRACT

The rediscovery of the rare *Fryxellia pygmaea* (Correll) Bates in central Coahuila is reported, and its ecology and taxonomic affinities are discussed. The plant has a chromosome count of $2n = 16$.

RESUMEN

Se reporta el redescubrimiento de una población de la infrecuente *Fryxellia pygmaea* (Correll) Bates de la parte central de Coahuila, y se discute su ecología y sus afinidades taxonómicas. El número cromosómico de la planta es $2n = 16$.

The monotypic genus *Fryxellia* has been one of the least known genera of the Malvaceae. The type was collected by Capt. John Pope in 1854 at an unknown locality in Texas, probably west of the Pecos River (Correll 1968; Bates 1974). The species was subsequently recollected by Robert M. Stewart in 1941 near Puerto del Aire near the southern end of the Sierra de la Encantada in Coahuila. Originally described in the genus *Anoda* (Correll 1968), the plant was recognized by Bates (1974) to be distinct and to constitute a monotypic genus, isolated from other genera of the tribe Malveae (Bates 1974; Fryxell 1988) as the Fryxellia alliance.

In early September 1990 we had the opportunity to revisit Puerto del Aire (Fig. 1) in an attempt to relocate the plant. We succeeded in finding a population of several hundred plants, perhaps the same population found by Stewart. The population was restricted to a relatively small area of "dry open hillside." The area occupied by the population was perhaps 100 – 150 m in diameter, beyond which no plants were found. Within the area, however, the population was relatively dense, with individual plants occurring within a meter or two of one another. The population was clearly an old

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one, with many individual plants having extensive perennial rootstocks. What edaphic or other factors are involved in restricting the population to this small area were not immediately evident and are not known. It may be speculated, however, that the population observed is in fact an ancient clone, spreading laterally by proliferating rootstocks. Even though the plant has an apparently efficient method of seed dispersal, and subsequent germination tests have shown the seeds to be fully viable, seedling establishment at a new locality in the severe desert environment of central

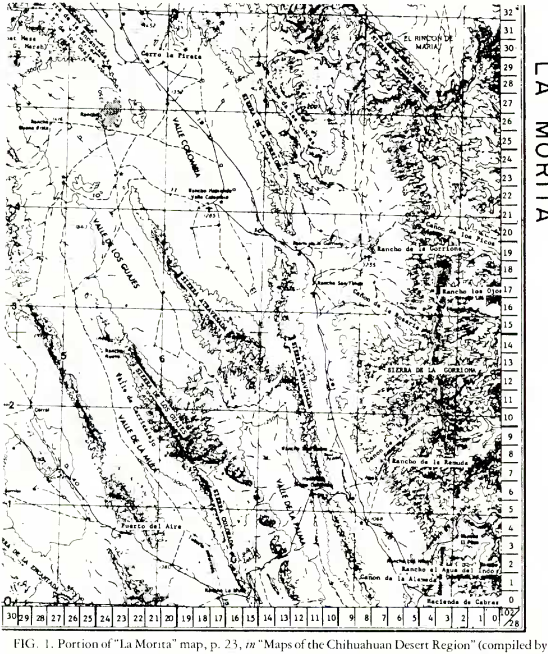

FIG. 1. Portion of "La Morita" map, p. 23, *in* "Maps of the Chihuahuan Desert Region" (compiled by José García), to accompany "A Gazetteer of the Chihuahuan Desert Region, A Supplement to the Chihuahuan Desert Flora" (by J. Henrickson and R.M. Straw, 1976).

Coahuila may be a relatively rare event, dependent upon a favorable pattern of rainfall in a particular year. A perennial, caespitose habit, coupled with vegetative propagation by root proliferation, may be the secret of survival for this species in this habitat. Unfortunately, we did not consider this possibility at the time we were in the field when, as a test of this hypothesis, we could have looked for subterranean interconnections of adjacent plants.

The Plants

Summer rainfall in this area had been above average in 1990, so that the plants were in relatively good condition. All except the youngest plants were fruiting, with flowers and buds still developing. Fruits were relatively abundant, indicating that the plants were vigorously reproductive. Individual plants form small rosettes on the order of 15 cm diameter. They are not acaulescent (as described), although they are indeed caespitose. Each plant has one to several short stems 1 – 2 cm long with very short, crowded internodes. The rootstocks are thick (ca. 1 cm or more in diameter), well branched, and penetrate deep into the gravelly soil; the roots are apparently food-storage organs.

Buds and flowers were observed and photographed, on the basis of which corolla color can be described as a rich orange (Fig. 2). After abscission of the corolla, the accrescent calyx ultimately flares to a rotate form and, as the fruit matures, takes on a reddish coloration on the exposed (adaxial) side. Upon maturation of the fruit, abscission is at the base of the calyx, so that the calyx and the contained fruit together are the diaspore. The calyx evidently serves as a sail to be blown over the ground as a form of wind dispersal.

Styles and stigmas were observed and were found to have the abruptly capitate form and glabrous condition that are characteristic of the genus *Anoda*. These features, together with the general aspect of the fruits, explain Correll's original placement of this species in *Anoda*. On the other hand, the dorsal spur, which accounts for the resemblance of the mericarps of *Fryxellia* to those of *Anoda*, differs in that the spur clearly has a suture of dehiscence in *Fryxellia* and but not in *Anoda*.

The mericarps of *F. pygmaea* (Correll) Bates are well illustrated by Bates (1974, Fig. 1, Ab, Ac). One item of information can be added, however. The endoglossum is in fact a divided structure, consisting of two awl-like internal growths extending forward from the dorsal wall, not a single such growth as was illustrated. Thus, the endoglossum shows a resemblance to that found in the genus *Batesimalva*, most nearly to that found in *B. pulchella* Fryx.

FIG. 2. *Fryxellia pygmaea*. Plant grown in the greenhouse from seed.

Questions remain concerning the affinities of the genus *Fryxellia*. The stigma morphology suggests an affiliation with *Anoda*. The endoglossum structure suggests an affiliation with *Batesimalva*, as does the leaf form and geographical distribution. Furthermore, the accrescent calyx of *F. pygmaea* shows some resemblance to the somewhat accrescent calyx of *B. pulchella*. However, other characters, such as the caespitose habit, the orange corolla, the strongly accrescent calyx, and the detailed fruit morphology, clearly justify Bates' segregation of *Fryxellia* as a distinct genus. Conceivably, *Fryxellia* may be a connecting link (by reduction of the upper cell of the mericarp, with the endoglossum remaining as a vestige of this former, hypothesized condition) between *Batesimalva* and *Anoda* and thus provide an indication of the phylogenetic origin of the *Anoda-Periptera* alliance. A chromosome count of $2n = 16$ was obtained for *F. pygmaea* (Fig. 3). The base chromosome number for *Anoda* is x = 15 (Bates 1987), for *Batesimalva* x = 16 (Bates & Blanchard 1970). Pollen aperture number (Hashmi 1970, Fryxell 1988), is 3 for *Fryxellia*, 3–4 for *Batesimalva*, and usually 30 or more for *Anoda*. These data indicate a placement of *Fryxellia* closer to

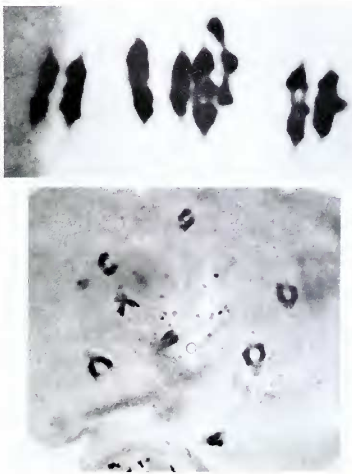

FIG. 3. Chromosomes of *Fryxellia pygmaea*. Top, metaphase I (× 2160); bottom, diplotene (× 833).

Batesimalva than to *Anoda*.

Finally, it may be asked if this species should be considered as "threatened or endangered." The plants observed were locally abundant and highly fruitful, producing abundant viable seeds, but were very localized in distribution. What ecological factors mediate this localization are unknown. Only one population of the species is certainly known, and the species can arguably be described as the rarest plant of the Chihuahuan Desert. Yet it was also collected in Texas by Pope, probably somewhere west of the Pecos River, a direct distance of 200 – 300 km (or more) to the northwest. An ample amount of relatively undisturbed, apparently suitable habitat lies in the intervening area, in which the species might be expected to occur. Much of this area is unexplored botanically or at least poorly explored. Therefore, it seems more suitable to describe this species as "insufficiently known" rather than "threatened, endangered, or extinct," as listed by Valdés and Johnston (1988).

The recent collection, duplicates of which will be distributed, is cited as follows:

MEXICO: Coahuila: Mpio. de Ocampo, Sierra de la Encantada (28° 4-1/2′ N, 102° 25′ W), alt. 1250 m, 8 Sep 1990, *Fryxell, Valdés, Carranza, Vázquez & Meza 5006* (ANSM, BRIT-SMU, pf, and other duplicates to be distributed).

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